1c) $2\int \frac{1}{2\sqrt{x}} \sin(\sqrt{x})\, dx$;

Let $u = \sqrt{x} = x^{1/2}$

$\frac{du}{dx} = \frac{1}{2} x^{-1/2}$

$du = \frac{1}{2\sqrt{x}} dx$

$2\, du = \frac{1}{\sqrt{x}} dx$

$\int \sin(u)\, du$

$\int 2 \sin u\, du$

$= 2(-\cos u) + C$

$= -2\cos(\sqrt{x}) + C$

1b) $\int \cos^3 x \sin x\, dx$

$\int u^3\, du$

Let $u = \cos x$

$\frac{du}{dx} = -\sin x$

and so $du = -\sin x\, dx$

$-du = \sin x\, dx$

$-\int (u)^3\, du$

$= -\frac{u^4}{4} + C$

$= -\frac{(\cos x)^4}{4} + C$

$\frac{d}{dx}\left(-\frac{(\cos x)^4}{4} + C\right) =$

$-\frac{4(\cos x)^3\left(\frac{d}{dx}\cos x\right)}{4} = -(\cos x)^3(-\sin x)$

1d) $\int \frac{3x}{\sqrt{4x^2+5}}\,dx$ =

$\int \frac{1}{\sqrt{u}}\,du$

Let $u = 4x^2+5$

$\frac{du}{dx} = 8x$

$du = 8x\,dx$

Hi!

$\frac{3}{8}\int \frac{8x}{\sqrt{4x^2+5}}\,dx$

$\frac{3}{8}\int \frac{1}{\sqrt{u}}\,du$ $u^{-1/2}$

$= \frac{3}{8}\frac{u^{1/2}}{1/2} + C$

$= \frac{3}{4}\sqrt{4x^2+5} + C$

1c) $\int \frac{1}{\sqrt{x}} \sin(\sqrt{x})\, dx$

$\int \sin(u)\, du$

2a, c
1 c, d
4a

$u = \sqrt{x} = x^{1/2}$

$\frac{du}{dx} = \frac{1}{2} x^{-1/2}$

$du = \frac{1}{2\sqrt{x}} dx$

$2du = \frac{1}{\sqrt{x}} dx$

$2\int \sin(u)\, du$

$= 2(-\cos u) + C$

$= -2\cos\sqrt{x} + C$

2a) $\int \sec^2(4x+1)\,dx$

Let $u = 4x+1$

$\frac{du}{dx} = 4$

$\frac{du}{4} = \frac{4}{4}dx$

$\frac{1}{4}du = dx$

$\int \frac{1}{4}\sec^2(u)\,du$

$= \frac{1}{4}\int \sec^2 u\,du$

$= \frac{1}{4}(\tan u) + C$

$\Rightarrow \frac{1}{4}\tan(4x+1) + C$

$\int \sec^2 x\,dx$
$= \tan x + C$

2a
7
11
20
17

4ac

4a $\int x^2 \sqrt{x+1}\, dx$

Let $u = x+1$

$\frac{du}{dx} = 1$

$du = dx$

$u - 1 = x$

$(u-1)^2 = x^2$

$\int (u-1)^2 \sqrt{u}\, du$

$\int (u^2 - 2u + 1) \sqrt{u}\, du$ $u^{1/2}$

$\int u^{5/2} - 2u^{3/2} + u^{1/2}\, du$

ALL the Xs have to be changed to Us

4c) $\int \sin(x - \pi)\, dx$

$\int \sin u\, du = -\cos u + C$

Let $u = x - \pi$

$\frac{du}{dx} = 1$

$du = dx$

$\int \sin(u)\, du$

$= -\cos u + C$

$= -\cos(x - \pi) + C$

4d) $\int \frac{5x^4}{(x^5+1)^2} dx$

$\int \frac{1}{u^2} du = \int u^{-2} du = \frac{u^{-1}}{-1} + C$

Let $u = x^5 + 1$

$\frac{du}{dx} = 5x^4$

$du = 5x^4\, dx$

$\int \frac{1}{u^2}\, du$

$= -\frac{1}{u} + C = -\frac{1}{x^5+1} + C$

7) $\int x(2-x^2)^3\,dx$

Let $u=2-x^2$

$\frac{du}{dx}=-2x$

$\frac{du}{-2}=\frac{-2x\,dx}{-2}$

$-\frac{1}{2}du=x\,dx$

$\int u^3du=\frac{u^4}{4}+C$

$-\frac{1}{2}\int u^3\,du$

$=-\frac{1}{2}\left(\frac{u^4}{4}\right)+C$

$=-\frac{1}{8}(2-x^2)^4+C$

29} $\int \frac{\sin\left(\frac{5}{x}\right)}{x^2}\,dx$

$\int \sin(u)\,du$

u?

$\frac{5}{x}$ x^2

x

x^{-2}

Let $u = \frac{5}{x} = 5x^{-1}$

$\frac{du}{dx} = -5x^{-2} = \frac{-5}{x^2}$

$du = \frac{-5}{x^2}\,dx$

$-\frac{1}{5}\,du = \frac{1}{x^2}\,dx$

$-\frac{1}{5}\int \sin(u)\,du$

$= -\frac{1}{5}(-\cos u) + C$

$= \frac{1}{5}\cos\left(\frac{5}{x}\right) + C$

$\int \frac{x\sin\left(\frac{5}{x}\right)}{x \cdot x^2}\,dx$

Let $u = x^{-2}$

$u = \frac{1}{x^2}$

$\sqrt{u} = \frac{1}{x}$

$5\sqrt{u} = \frac{5}{x}$

$\frac{1}{\sqrt{u}} = x$

$\frac{du}{dx} = -2x^{-3} = \frac{-2}{x^3}$

$du = \frac{-2}{x^3}\,dx$

$-\frac{1}{2}\,du = \frac{1}{x^3}\,dx$

$-\frac{1}{2}\int \frac{\sin(5\sqrt{u})}{\sqrt{u}}\,du$

Let $v = 5\sqrt{u} = 5u^{1/2}$

$\frac{dv}{du} = \frac{5}{2}u^{-\frac{1}{2}} = \frac{5}{2\sqrt{u}}$

$dv = \frac{5}{2\sqrt{u}}\,du$

$\frac{2}{5}\,dv = \frac{1}{\sqrt{u}}\,du$

$-\frac{1}{2}\left(\frac{2}{5}\right)\int \sin(v)\,dv$

$= -\frac{1}{5}(-\cos v) + C$

$= \frac{1}{5}\cos(5\sqrt{u}) + C$

$= \frac{1}{5}\cos\left(5\sqrt{x^{-2}}\right) + C$

$= \frac{1}{5}\cos\left(5\sqrt{\frac{1}{x^2}}\right) + C$

$= \frac{1}{5}\cos\left(5\left(\frac{1}{x}\right)\right) + C$

30) $\int \frac{\sec^2(\sqrt{x})}{\sqrt{x}}\,dx$

Let $u = \sqrt{x} = x^{1/2}$

$\frac{du}{dx} = \frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}}$

$2\,du = \frac{1}{\sqrt{x}}\,dx$

$2\int \sec^2 u\;du$

$= 2\tan u + C$

$= 2\tan(\sqrt{x}) + C$

$\int \frac{\sec^2(\sqrt{x})}{\sqrt{x}}\,dx$

$2\tan(\sqrt{x}) + C$

$\frac{d}{dx}x^{1/2}$
$\frac{1}{2}x^{-\frac{1}{2}}$

$\frac{d}{dx}\left(\tan(\sqrt{x})\right)$

$= \sec^2(\sqrt{x}) \cdot \left(\frac{1}{2\sqrt{x}}\right)$

$\frac{d}{dx}\left(2\tan(\sqrt{x})\right)$

$= 2\left[\sec^2(\sqrt{x})\left(\frac{1}{2\sqrt{x}}\right)\right]$

31) $\int x^2 \sec^2(x^3)\, dx$

Let $u = x^3$

$\frac{du}{dx} = 3x^2$

$du = 3x^2\, dx$

$\frac{1}{3} du = x^2\, dx$

$\frac{1}{3}\int \sec^2 u\, du = \frac{1}{3}(\tan u) + C = \frac{1}{3}(\tan(x^3)) + C$

$\frac{d}{dx}\left(\frac{1}{3}\tan(x^3)\right)$

$= \frac{1}{3}\left(\sec^2(x^3)\cdot(3x^2)\right)$

$= \sec^2(x^3)\cdot x^2$

✓

$$\int \cos^3(2t)\sin(2t)\,dt = \frac{1}{2}\int \cos^3 u \cdot \sin u \, du$$

$(\cos u)^3 (\sin u)$

Let $u = 2t$

$\cos^3 2t \sin 2t$

$\frac{du}{dt} = 2$

$2t$

$du = 2dt$

t

$\frac{1}{2}du = dt$

Let $v = \cos u$

$\frac{dv}{du} = -\sin u$

$dv = -\sin u\, du$

$-dv = \sin u\, du$

$-\frac{1}{2}\int v^3 \; dv$

$= -\frac{1}{2}\left(\frac{v^4}{4}\right) + C$

$= -\frac{1}{2}\,\frac{\cos^4 u}{4} + C$

$= -\frac{1}{2}\,\frac{\cos^4(2t)}{4} + C$

$\int \cos^3(2t)\sin(2t)\,dt$

Let $u = \cos(2t)$

$\frac{du}{dt} = -2\sin(2t)$

$-\frac{1}{2}du = \sin(2t)\,dt$

$\Rightarrow -\frac{1}{2}\int u^3\,du$

33) $\int \sin^5(3t)\cos(3t)\,dt$

Let $u = \sin(3t)$

$$\frac{du}{dt} = \cos(3t)\cdot(3)$$

$$\frac{1}{3}du = \cos(3t)dt$$

$$\frac{1}{3}\int u^5\,du$$

$$= \frac{1}{3}\left(\frac{u^6}{6}\right) + C$$

$$= \frac{1}{18}[\sin(3t)]^6 + C$$

39
40
34
36

34) $\int \frac{\sin(2\theta)}{(5+\cos(2\theta))^3} d\theta$

Let $u = 5+\cos(2\theta)$

$\frac{du}{d\theta} = -\sin(2\theta)\cdot(2)$

$du = -2\sin 2\theta \, d\theta$

$-\frac{1}{2} du = \sin 2\theta \, d\theta$

$-\frac{1}{2}\int \frac{1}{u^3} \, du$

$\frac{\sin^2}{\cos^2} + \frac{\cos^2}{\cos^2} = \frac{1}{\cos^2}$

$\tan^2 + 1 = \sec^2$

$\tan^2 = \sec^2 - 1$

36) $\int \tan^3 5x \sec^2 5x \, dx$

Let $u = \tan 5x$

$\frac{du}{dx} = \sec^2(5x)\cdot 5$

$\frac{1}{5} du = \sec^2(5x) dx$

$\frac{1}{5}\int u^3 \, du$

$\frac{d}{dx}(\sec x) = \sec x \tan x$

$\frac{d}{dx}(\tan x) = \sec^2 x$

$\int \tan^3(5x) \sec^2(5x) dx$

Let $u = \sec(5x)$

$\frac{du}{dx} = \sec(5x)\tan(5x)\cdot 5$

$\frac{1}{5} du = \sec(5x)\tan(5x) dx$

$\int \tan^2(5x)\sec(5x)[\sec 5x \tan 5x dx]$

$\int (\sec^2 5x - 1)\sec(5x)[\quad]$

$\frac{1}{5}\int (u^2-1)(u) du$

"$u^{1/2}$"

35) $\int \cos(4\theta)\sqrt{2-\sin(4\theta)}\,d\theta$

Let $u=2-\sin(4\theta)$

$\frac{du}{d\theta} = -\cos(4\theta)\cdot(4)$

$-\frac{1}{4}\,du = \cos(4\theta)\,d\theta$

$-\frac{1}{4}\int \sqrt{u}\,du$

$\int \cos(4\theta)\sqrt{2-\sin(4\theta)}\,d\theta$

? Let $u=(2-\sin(4\theta))^{1/2}$

$du = \frac{1}{2\sqrt{2-\sin 4\theta}}(-\cos 4\theta)(4)\,d\theta$

$-\frac{1}{2}\,du = \frac{\cos 4\theta}{\sqrt{2-\sin 4\theta}}\,d\theta$

$\int \cos 4\theta \, \frac{(\sqrt{2-\sin 4\theta})^2}{\sqrt{2-\sin 4\theta}}\,d\theta$

$-\frac{1}{2}\int u^2\,du$

$-\frac{1}{2}\frac{u^3}{3}+C = -\frac{1}{6}\left(\sqrt{2-\sin 4\theta}\right)^3+C$

39) $\int \sec^3(2x)\tan(2x)\,dx$

Let $u=\sec(2x)$

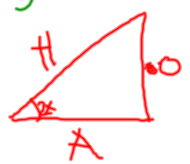
$du = 2\sec(2x)\tan(2x)\,dx$

$\frac{1}{2}\int u^2\,du - \cdot - \cdot$

Let $u=\tan(2x)$

$\frac{1}{2}du = \sec^2(2x)\,dx$

$\int \sec(2x)\tan(2x)\sec^2(2x)\,dx$



$\tan=\frac{O}{A}$ $\sec=\frac{1}{\cos}=\frac{1}{\frac{A}{H}}=\frac{H}{A}$

40)

$$\int \sin(\sin\theta)\cos\theta\, d\theta$$

$$u = \sin\theta$$

$$du = \cos\theta\, d\theta$$

$$\int \sin u\, du$$

$$= -\cos u + C = -\cos(\sin\theta) + C$$

45) $\int x\sqrt{x-3}\,dx$

Let $u = x-3$
$du = dx$ $\quad (u+3) = x$

$\int (u+3)u^{1/2}\,du$

$\Rightarrow \int u^{3/2} + 3u^{1/2}\,du$

$\frac{u^{5/2}}{5/2} + 3\left(\frac{u^{3/2}}{3/2}\right) + C$

$= \frac{2}{5}u^{5/2} + 3\left(\frac{2}{3}u^{3/2}\right) + C$

$= \frac{2}{5}(x-3)^{5/2} + 2(x-3)^{3/2} + C$

46) $\int \frac{y}{\sqrt{y+1}}\,dy$

Let $u = y+1 \Rightarrow (u-1) = y$
$du = dy$

$\int \frac{u-1}{\sqrt{u}}\,du = \int \frac{u}{u^{1/2}} - \frac{1}{u^{1/2}}\,du$

$= \int u^{1/2}\,du - \int u^{-1/2}\,du$

$= \frac{2u^{3/2}}{3} - 2u^{1/2} + C$

$= \frac{2}{3}(y+1)^{3/2} - 2(y+1)^{1/2} + C$

49) $\int \frac{t+1}{t}\,dt = \int 1+\frac{1}{t}\,dt$

$= \int 1+t^{-1}\,dt = \cancel{t+\frac{t^0}{0}+C}$

rule 11

$= t+\ln|t|+C$

$\int \frac{1}{x}\,dx = \ln|x|+C$

$$\int \sin x \cos x \, dx$$

Let $u = \cos x$

$$\frac{du}{dx} = -\sin x$$

$$du = -\sin x \, dx$$

$$-du = \sin x \, dx$$

$$-\int u \, du = -\frac{u^2}{2} + C$$

$$-\frac{\cos^2 x}{2} + C$$

$\sin^2 x + \cos^2 x = 1$

$\sin^2 x = 1 - \cos^2 x$

$\frac{\sin^2 x}{2} = \frac{1}{2} - \frac{\cos^2 x}{2}$

Let $u = \sin x$

$$\frac{du}{dx} = \cos x$$

$$du = \cos x \, dx$$

$$\int u \, du$$

$$= \frac{u^2}{2} + C$$

$$= \frac{\sin^2 x}{2} + C$$

$$= \frac{1}{2} - \frac{\cos^2 x}{2} + C$$

$$\int x^3 \sqrt{x}\, dx$$

$$= \int (x^3)(x^{1/2})\, dx = \int x^{7/2}\, dx$$

DO NOT WRITE THIS DOWN
DO NOT EVEN READ THIS

$$\frac{x^4}{4} \cdot \frac{2}{3} x^{3/2}$$

$$= \frac{x^{9/2}}{9/2} + C$$

$$= \frac{2}{9} x^{9/2} + C$$

6.3 homework

2010-10-29 Pd 2

(11)

$$\frac{1}{4}\int 4\sec 4x \tan 4x \, dx$$

Let $u = 4x$

$$\frac{du}{dx} = 4$$

$$du = 4\,dx$$

$$\frac{du}{4} = \frac{4\,dx}{4}$$

$$\frac{1}{4}du = dx$$

$$\frac{1}{4}\int \sec u \tan u \, du$$

$$= \frac{1}{4}(\sec u) + C = \frac{1}{4}(\sec(4x)) + C$$

$$\int \sec u \, du = ?$$

$$\int \tan u \, du = ?$$

$$\frac{d}{dx}\left(? \right) = \sec u \tan u$$

sec u

$$\int \sec u \tan u \, du = \sec u + C$$

1d) $\int \frac{3x}{\sqrt{4x^2+5}}\,dx$

Let $u = 4x^2+5$

$\frac{du}{dx} = 8x$

$\frac{du}{8} = \frac{8x}{8}\,dx$

$\frac{1}{8}du = x\,dx$

$\frac{1}{8}\int 3\frac{1}{\sqrt{u}}\,du$

$= \frac{3}{8}\int u^{-1/2}\,du$

$= \frac{3}{8}\left(\frac{u^{1/2}}{1/2}\right) + C$

$= \frac{3}{8}2\sqrt{u} + C$

$= \frac{3}{4}\sqrt{4x^2+5} + C$

$\int \frac{1}{\sqrt{u}}\,du = \int u^{-\frac{1}{2}}\,du = \frac{u^{1/2}}{1/2} + C$

$= 2\sqrt{u} + C$

1d 11 17

11)

$$\frac{1}{4}\int 4\sec(4x)\tan(4x)\,dx$$

Let $u = 4x$

$$\frac{du}{dx} = 4$$

$$\frac{du}{4} = \frac{4\,dx}{4}$$

$$\frac{1}{4}du = dx$$

$$\frac{1}{4}\int \sec u \tan u \, du$$

$$= \frac{1}{4}\sec u + C$$

$$= \frac{1}{4}\sec(4x) + C$$

$\int \sec u \tan u \, du = ?$

$\int \sec u \, du = ?$

$\int \tan u \, du = ?$

$$\frac{d}{dx}(?) = \sec u \tan u$$

$$\frac{d}{dx}(\sec u) = \sec u \tan u$$

$$\int \sec u \tan u \, du = \sec u + C$$

17) $\int t\sqrt{7t^2+12}\,dt$

Let $u = 7t^2+12$

$\frac{du}{dt} = 14t$

$\frac{du}{14} = \frac{14t\,dt}{14}$

$\frac{1}{14}\,du = t\,dx$

$\int \sqrt{u}\,du = \int u^{1/2}\,du$

$= \frac{u^{3/2}}{3/2} + C$

$\frac{1}{14}\int \sqrt{u}\,du$

$= \frac{1}{14}\left(\frac{2}{3}u^{3/2}\right) + C$

$= \frac{1}{21}(7t^2+12)^{3/2} + C$

18

$$\int \frac{x}{\sqrt{4-5x^2}}\,dx$$

Let $u = 4-5x^2$

$$\frac{du}{dx} = -10x$$

$$\frac{du}{-10} = \frac{-10}{-10}x\,dx$$

$$-\frac{1}{10}du = x\,dx$$

$$-\frac{1}{10}\int \frac{1}{\sqrt{u}}\,du$$

$$= -\frac{1}{10}\left(2\sqrt{u}\right) + C$$

$$= -\frac{1}{5}\sqrt{4-5x^2} + C$$

$$\int \frac{1}{\sqrt{u}}\,du = \int u^{-1/2}\,du$$

$$= \frac{u^{1/2}}{1/2} + C$$

$$= 2\sqrt{u} + C$$

30) $\displaystyle\int \frac{\sec^2(\sqrt{x})}{\sqrt{x}}\,dx$

$\displaystyle\int \sec^2 u\,du = \tan u + C$

Let $u = \sqrt{x} = x^{\frac{1}{2}}$

$$\frac{du}{dx} = \frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}}$$

$$du = \frac{1}{2\sqrt{x}}\,dx$$

3a) $\int \cot x \csc^2 x \, dx$

Let $u = \cot x$

$\frac{du}{dx} = -\csc^2 x$

$-du = \csc^2 x \, dx$

$\frac{d}{dx}(\cot x) = -\csc^2 x$

$-\int \csc^2 u \, du = \cot u + C$

$-\int u \, du$

$= -\frac{u^2}{2} + C$

$= -\frac{(\cot x)^2}{2} + C$

$\boxed{14}$ $\displaystyle\int \frac{1}{2x}\,dx = \frac{1}{2}\int \frac{1}{x}\,dx$ I know $\displaystyle = \frac{1}{2}\int x^{-1}\,dx$

$= \frac{1}{2}\left(\frac{x^0}{0}\right) + C$

hmmm

orig	driv
$x^3 \rightarrow$	$3x^2$
$x^2 \rightarrow$	$2x^1$
$x \rightarrow$	$1x^0$
$x^{-1} \rightarrow$	$-x^{-2} = -\frac{1}{x^2}$
$x^{-2} \rightarrow$	$\frac{-2}{x^3}$

what about $\frac{d}{dx}(?) = \frac{1}{x}$?

$= \frac{1}{2}\ln|x| + C$

$\int \cos^3(2t)\,\sin 2t\,\cancel{dt}$

32 (using 2t for u?)

$u = 2t$

$du = 2\,dt$

$\frac{1}{2}\int \cos^3(u)\,\sin(u)\,du$

$\frac{1}{2}\,\frac{1}{4}\sin^4(u)(-\cos u)$

$-\frac{1}{8}\sin^4 u\,\cos u$

$-\frac{1}{8}\sin 2t\,\cos 2t$.

$\cancel{-\cos 2t(\cos 2t)(-\sin 2t)(2)}$

$+\cos 2t(\cos 2t)+\sin 2t(-\sin 2t)$

$(1-\sin^2 x)$

$$\int (\cos x)^3 (\sin x)\, dx$$

$(\cos x)^2 (\cos x)$

Let $u = \sin x$

$du = \cos x \, dx$

u

$\cos x$ [blk ^{3}]

$\sin x$

$\cos^2 x + \sin^2 x = 1$

$\cos^2 x = (1 - \sin^2 x)$

$$\int (1-u^2)(u)\, du$$

$$= \int u - u^3 \, du$$

$$\frac{u^2}{2} - \frac{u^4}{4} + C = \frac{\sin^2 x}{2} - \frac{\sin^4 x}{4} + C$$

$$\int \cos^3 x \sin x \, dx \rightarrow -\int u^3 \, du$$

Let $u = \cos x$

$du = -\sin x \, dx$

$-du = \sin x \, dx$

$$= -\frac{u^4}{4} + C$$

$$= -\frac{\cos^4 x}{4} + C$$

$$\frac{d}{dx}(\tan u) = \sec^2 u$$

$$\frac{d}{dx}(\sec u) = \sec u \tan u$$

39) $\int \sec^3(2x)\tan(2x)\,dx$

Let $u = \sec(2x)$

$du = 2\sec(2x)\tan(2x)\,dx$

$$\int \sec^2(2x)\,\sec(2x)\tan(2x)\,dx$$

$$\frac{1}{2}\int u^2\,du = \frac{1}{2}\frac{u^3}{3} + C = \frac{1}{6}\sec^3(2x) + C$$

39a) $\int \sec^3(2x)\tan(2x)\,dx$

Let $u = \tan 2x$

$\frac{1}{2}du = \sec^2(2x)\,dx$

$$\int \underbrace{\cancel{\sec(2x)}}_{}{}^{\sqrt{\tan^2 2x+1}}\ \underbrace{\tan(2x)}_{u}\ \sec^2(2x)\,dx$$

$$\frac{1}{2}\int \sqrt{u^2+1}\,(u)\,du$$

Let $v = u^2+1$

$\frac{1}{2}dv = u\,du$

$$\frac{1}{2}\left(\frac{1}{2}\right)\int v^{1/2}\,dv$$

$$\frac{1}{2}\,\frac{1}{2}\,\frac{2}{3}v^{3/2}+C$$

$$= \frac{1}{6}(u^2+1)^{3/2}+C = \frac{1}{6}(\tan^2(2x)+1)^{3/2}+C$$

$$= \frac{1}{6}(\sec^2(2x))^{3/2} = \frac{1}{6}\sec^3(2x)+C$$

XC

$\frac{\sin^2}{\cos^2}+\frac{\cos^2}{\cos^2}=\frac{1}{\cos^2}$

$\tan^2 x+1=\sec^2 x$

$\sqrt{\tan^2 x+1}=\sec x$

$u = \tan 2x$

$v = u^2+1$

$v = \tan^2 2x+1$

$= \sec^2(2x)$

45)

$$\int x\sqrt{x-3}\,dx$$

Let $u = x-3 \Rightarrow x = u+3$

$du = dx$

$$\int (u+3)\sqrt{u}\,du$$

$$\int (u+3)u^{1/2}\,du = \int u^{3/2}+3u^{1/2}\,du$$

$$= \frac{u^{5/2}}{5/2} + 3\,\frac{u^{3/2}}{3/2} + C$$

$$= \frac{(x-3)^{5/2}}{5/2} + 2(x-3)^{3/2} + C$$

$$\int x^3\sqrt{x}\,dx$$

$u = x$

$du = dx$

$$\int u^3 u^{\frac{1}{2}}\,du = \int u^{7/2}\,du$$

$$\frac{2u^{9/2}}{9} + C = \frac{2(x)^{9/2}}{9} + C$$

$$\int x^3\sqrt{x}\,dx$$

$$x^3 x^{\frac{1}{2}}\,dx$$

$$\int f'g + g'f$$

$$\int 3x^2\left(x^{\frac{1}{2}}\right) + \left(\frac{1}{2}x^{-\frac{1}{2}}\right)\left(x^3\right) \quad \frac{6}{2} \quad 1$$

$$3x^{\frac{5}{2}} + \frac{1}{2}x^{\frac{5}{2}}$$

$$\int 3\tfrac{1}{2}x^{\frac{5}{2}}$$

$$\frac{2}{7}\left(\frac{7}{2}x^{\frac{7}{2}}\right) \int x^{\frac{7}{2}}$$

6.3 homework

2010-10-28 Pd 3